



May 25, 2005

Mr. Chris Gillis
Pacific Gas and Electric Company
Interconnection Services
245 Market Street, Room 775, Mail Code N7L
San Francisco, CA 94105

Subject: Bullard Energy Center Project
Preliminary Interconnection Approval

Dear Mr. Gillis:

The California ISO (CAISO) has reviewed the System Impact Study (SIS) for the Bullard Energy Center Project (Bullard EC Project), which proposes to loop into the Herndon-Kearney 230 kV line in Fresno, California, via a new substation to be built by Cinergy Solutions, Inc. The SIS, dated May 17, 2005, was conducted by Pacific Gas and Electric Company (PG&E), as requested by the generation developer, Cinergy Solutions, Inc. The proposed plant will consist of two gas turbine generators rated at 102.6 MW each, for a total output of 205.2 MW. The plant auxiliary load will be 5.2 MW, and the maximum net output to the grid will be 200 MW. The proposed operation date for this generation project is June 1, 2008.

The System Impact Study included power flow, steady state and dynamic stability analyses, and a system protection and substation evaluation. A summary of the study assumptions and study results are included below, along with CAISO recommendations and conclusions.

Study Assumptions

The PG&E transmission system was analyzed using the 2008 Summer Peak Area 6 (Fresno Area) base case, 2008 Summer Off-peak base case and 2009 Spring Peak base case. All study base cases were developed from PG&E's 2004 base case series, and have a 1-in-10 year weather load level for the summer peak case in the Fresno area. The summer off-peak case assumed to be 50% of the summer peak load level in the Fresno area, with 5000 MW of flow on Path 15 in the South to North direction, and two Helms units in pumping mode. Typical spring season load (70-85% of summer peak load level) was applied in the spring peak case with a very high hydro generation level. The system model included all generation projects that would be operational by June 2008. All

PG&E approved transmission projects, which were planned to be in service by June 2008, were also modeled.

Study Results

1. Under Normal Operating Conditions

The power flow analysis concluded that under summer off-peak operating conditions with two Helms pumping units on line (310 MW each), interconnecting the Bullard EC Project would create a 102% normal overload on the Herndon – Bullard Energy Center 230 kV line, based on the summer normal rating of 825 amps. The pre-project normal loading on the Herndon – Kearney 230 kV line is 60%. The sensitivity study base case with three Helms pumping units on line (300 MW each) concluded that interconnecting the Bullard EC Project would create a 122% normal overload on the Herndon – Bullard Energy Center 230 kV line. The pre-project normal loading on the Herndon – Kearney 230 kV line is 80% with three Helms pumping units on line.

2. Under Emergency Operating Conditions

Caused by Category B Contingencies:

The SIS concluded that during 2009 spring peak operating conditions, interconnecting the Bullard EC Project would cause the following Category B emergency overloads:

- Aggravate the existing emergency overloads on the Glass - Madera 70 kV line from 108% to 122% following the outage of the Kearney – Bullard Energy Center 230 kV line.
- Creating two emergency overloads, as listed below:

	Overloaded facilities	Contingency	Pre-Project loading (%)	Post-Project loading (%)
2009 Spring Peak Base Case	Kingsburg – Corcoran 115 kV #1 or #2 lines	Kingsburg – Corcoran 115 kV #2 or #1 lines	97%	103%
	Glass – Biola 70 kV line	Kearney – Bullard Energy Center 230 kV line	89%	104%

Caused by Category C Contingencies:

The SIS concluded that interconnecting the Bullard EC Project would aggravate four (4) existing emergency overloaded facilities, as listed below:

	Overloaded facilities	Contingency	Pre-Project loading (%)	Post-Project loading (%)
2009 Spring Peak Base Case	Warnerville 230/115kV Transformer #1, #2 or #3	Bellota – Melones 230kV Bellota – Warnerville 230kV	106%	116%
	Glass – Madera 70kV Line	Helm – McCall and Gates – McCall 230 kV lines	108%	122%

The SIS also concluded that interconnecting the Bullard EC Project would create ten (10) emergency overloaded facilities caused by Category C contingencies, as listed below:

	Overloaded facilities	Contingency	Pre-Project loading (%)	Post-Project loading (%)
2008 Summer Peak Base Case	Warnerville 230/115kV Transformer #1, #2 or #3	Bellota – Melones 230kV Bellota – Warnerville 230kV	99%	108%
2008 Summer Off-peak Base Case	Herndon – Bullard Energy Center 230kV Line	Gates E1 Bus Fault	76%	106%
	Los Banos – Westley 230kV Line	Herndon - Bullard Energy Center 230 kV & Gates – Gregg 230 kV Lines	97%	102%
	Herndon – Ashlan 230kV (Herndon – Fgrdn T1)	Gregg – Herndon #1 & #2 230kV Lines	77%	101%
2009 Spring Peak Base Case	Glass – Biola 70kV Line (Canandga – Glass)	Bullard Energy Center – Kearney 230 kV & Herndon – Ashlan 230kV Lines	89%	104%
	Helm – Kermann 70kV (SNJQTP – Agrico Jct)	Panoche – Kearney 230kV & Helm – Mc Call 230kV Lines	91%	110%
	Kearney – Caruthers 70kV Line	Mc Call – Kingsburg #1 & #2 230kV Lines	96%	103%
	Glass – Madera 70kV	Bullard Energy Center – Kearney 230kV & Gates – Gregg 230kV Lines	94%	117%

3. Protection Requirements

The preliminary protection requirements will consist of replacing the existing line protection and carrier equipment at Kearney and Herndon. The Herndon – Bullard EC 230kV Line will have a fully redundant, double-pilot current differential scheme, utilizing dual fiber optic communications. The Bullard EC – Kearney 230kV Line will utilize a two terminal carrier scheme. PG&E protection requirements are designed and intended to protect PG&E's system only. The applicant is responsible for the protection of its own system and equipment, and must meet the requirements in the PG&E Interconnection Handbook.

4. Substation Evaluation

Overstressed Circuit Breakers

The SIS substation evaluation identified four (4) 115 kV breakers at Herndon Substation and two (2) 230 kV breakers at Panoche Substation that would exacerbate existing overstress conditions as a result of the addition of the Bullard EC Project. The following table summarizes the breaker fault duties and the actual percentage increases for these breakers.

Substation & Breaker #	Interruptible Rating (Amps)	Before Bullard Project (Amps)	Before %	After Bullard Project (Amps)	After %	Increase %
Herndon CB 122	22,969	26,908	117%	29,393	128%	9%
Herndon CB 132	22,969	25,526	111%	27,948	122%	9%
Herndon CB 142	22,969	25,511	111%	27,935	122%	10%
Herndon CB 152	22,969	25,450	111%	27,904		
Panoche CB 222	22,969					
Panoche CB 322	22,969					

PG&E currently uses the following policy to allocate breaker replacement responsibility for projects that overstress or increase the level of overstress on existing circuit breakers:

- If a breaker is not overstressed and a project results in an overstressed condition of the breaker.
- If a breaker is already overstressed and a project increases the overstress by 5% or more, or the overstress level exceeds 25%.

Substation Configuration

The SIS substation evaluation recommended a three (3) breaker ring bus configuration requirements for the new looped substation to interconnect the Bullard Energy Center Project to PG&E's transmission grid.

CAISO Recommendations

- For the normal facility overload on the Herndon – Bullard Energy Center 230 kV line due to interconnecting the Bullard EC Project, CAISO concurs with the following PG&E proposed mitigation alternatives:
 - Reconductor the overloaded 230 kV transmission line.
 - Reduce generation net output to the grid from 200 MW to 190 MW with two Helms pumping units on line, and reduce to 100 MW generation net output to the grid with three Helms pumping units on line.
- For the Category B caused emergency overloads on the Kingsburg – Corcoran 115 kV #1 and #2 lines as well as the Glass – Madera and Glass – Biola 70 kV lines, the existing PG&E operation solutions¹ would mitigate the emergency overloads on all four (4) of these lines.
- For the emergency facility overloads caused by Category C contingencies due to interconnecting the Bullard EC Project, PG&E's existing operation solutions would mitigate overloads on all four (4) 70 kV lines including the Glass – Madera, Glass – Biola, Helm – Kerman and Kearney - Caruthers 70 kV lines. The remaining emergency overloads on three (3) 230 kV lines and three (3) Warnerville 230/115 kV transformer banks could be mitigated by generation dropping or load shedding. The generation developer, Cinergy Solutions, Inc, may be required to take part in, and be responsible for, the costs of operating procedures and/or Special Protection Schemes (SPS) developed to mitigate overloads resulting from Category C outages.
- Based on PG&E's current policy of allocating breaker replacement responsibility for projects, CAISO concurs with PG&E's recommendation for the Bullard EC Project to be responsible for the four 115 kV breaker replacements of CBs 122, 132, 142 and 152 at Herndon Substation.

CAISO Conclusions

Based on the information provided in the SIS, the CAISO is granting preliminary approval to interconnect the Bullard EC Project to the CAISO Grid. Final approval will be granted upon the satisfactory completion of the Facility Study (FS). The FS should be sent to the CAISO for review upon its completion.

¹ The existing operation solutions are opening Corcoran CB 142, Kearney CB 32, Biola CB 12 and Caruthers CB 22 under the operation conditions when the summer ratings are utilized.

If you have questions about the CAISO review of this study, please contact Jeff Miller at (916) 351-4464 (jmiller@caiso.com) or Janice Zewe at (916) 608-1275 (jzewe@caiso.com).

Sincerely,

Original signed by

Jeff Miller
Regional Transmission Manager

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